ROLE OF RETURN, RISK AND CORRELATION IN INVESTMENT DECISIONS

S.Praveena *

 Dr.K.Mahendran **

ABSTRACT

This study measures the Holding Period Return (HPR), Daily and Annualized Returns, Skewness, kurtosis and Correlation among stocks belongs to similar industry type of S&P CNX NIFTY stocks. S&P CNX 500 was considered as a market index. Daily closing price of stocks and closing value of nifty stocks were collected from the Prowess data source for a period between 31-12-2009 and 31-12-2010. During this period, the market has 252 trading days. The main objectives of this study are to empirically assess the buy and hold strategy, market timing strategy, and role of correlation in portfolio selection. The holding period return was calculated for every three months considering the stock's closing price as on 31st December 2009 as a base period. Daily average returns were calculated using the continuous compounding method. A correlation analysis was performed to understand the movement of stock related to market index. Skewness and kurtosis were performed to adding degrees of skewness and peakedness of stock returns in the hope of providing a wider perspective on investment behavior. Results of the study support the buy and hold strategy and forty seven percent of stocks outperformed the market index. A significant positive correlation was found among the stocks and market index. However, few stocks have very high correlation values, few have weak correlations and some stocks have negative correlation.

***Keywords :** Return, Risk, investment decision, portfolio selection.*

* Ph. D scholar, Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore.

** Associate Professor, Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore.

INTRODUCTION

Stock market is a barometer of the economy. It facilitates the flow of funds from those who have excess funds and those who are in need of funds. It is the lifeblood of the financial system for every nation. It is highly sensitive and quickly responds to incidents that happen in any corner of the world. Because of these reactions the stock market is highly volatile. The volatile nature of stock market makes difficult to predict the stock returns. Any forces that contribute to variations in return constitute element of risk. One of the major advances in investment over the last few decades has been the creation of an optimum investment portfolio. The creation of an optimum investment portfolio is not simply a matter of combining a lot of unique individual securities that have desirable risk-return characteristics. Investors are risk averse and they want to maximize the returns for a given level of risk. The relationship between the returns for assets in the portfolio is important. The uncertainty in stock returns can be quantified and categorized into two types of risk. One is an **unsystematic risk** which is firm specific and can be diversified. Next is **systematic risk** which is influenced by market factors prevails all time. Even after all these uncertainties, a large number of investors tend to invest their money in common stocks. Such investment in common stocks can provide more returns than the returns provided by corporate and government bonds.

Since return from the common stocks is uncertain, knowing the nexus between return and risk will be crucial for investors. This helps them to maximize the return and minimize the risk. The general principle is Investors have free access to fair and correct information on the returns and risk, investors are risk averse and try to minimize the risk and maximize return and they prefer higher return to lower return. No security is dominates by any other by having higher level of return and lower level of risk at the same time. Markowitz (1952) argues that combining g different set of securities investors eliminate their unsystematic risk. He also suggests considering correlation among securities while selecting the portfolio. On the other hand systematic risk is indicated by beta co efficient. It could be argued that there is relationship between the beta coefficient and stock volatility. The beta coefficient of the stock indicates its relation with the market. The possible returns increase and decrease in the price of a stock can be predicted in relation to possible increase and decrease the stock market. This study aims to investigate the return and risk nexus of the S&P CNX Nifty stocks. This study evaluates the investment strategies like buy and hold, and market timing. Furthermore this study measures the role of correlation, skewness and kurtosis in investment decisions.

REVIEW OF LITERATURE

Scott and Horvath (1980) that positive preference for skewness and negative preference for kurtosis has been postulated in explaining financial behavior of the investors. Skewness preference is one potential explanation for investors holding imperfectly diversified portfolios.

Dittmar (2002) showed that higher expected returns compensate investors bearing systematic variance and kurtosis risks, while investors forego return to benefit from increasing systematic skewness.

Harvey, Liechty, Liechty and Muller (2004) found that international asset holdings can be quite different under third-moment preferences compared to the standard mean-variance case.

Taleb (2004) found that investors commonly engage in negatively skewed stocks. A negatively skewed stock was characterized as a trade that has a large chance of making gains but a very small chance of losing big money.

Levy (2006), suggested that investors would consider the standard deviation while selecting the portfolio for the maximization of returns.

Guidolin and Timmermann (2007) investigated the international asset allocation effects of time-variations in higher order moments of stock returns such as skewness and kurtosis and suggested that the presence of regimes in the return distribution leads to a substantial increase in the investor's optimal holdings of US stocks as does the introduction of skew and kurtosis preferences.

Cvitanic, Polimenis, and Zapatero (2008) showed that ignoring standard deviation, skewness and kurtosis in portfolio allocation can imply welfare losses and overinvestment in risky assets.

Xing, Zhang, and Zhao (2008) identified that the cross-sectional differences in stock returns as a function of the risk-neutral skewness of individual stocks

Harvey, Liechty, and Muller (2010) emphasized the importance of skewness and kurtosis in portfolio allocation for the investors while selecting the stocks to get higher returns

Jerchern Lin (2011) said that investors are subject to different sources of skewness and fat tail risks through delegated investments. Volatility based tail risk hedging mechanism may not be effective for all fund styles and types

OBJECTIVES

- To compare the performance of the stock with the performance of market

- To compare the holding period return with the daily average return and daily annualized return
- To measure the relation among the stocks that belongs to the same industry as well as with the market index

Hypothesis

- H_o – there is no such relationship between the stocks holding period and measures of dispersion with the market return
- H_1 – there is positive relationship between the stocks holding period and measures of dispersion with the market return

Period of the study

Period of the study ranged between 31-12-2009 to 31-12-2010. During this period there were 252 trading days in national stock exchange India.

Sample

For this purpose of the study, stocks listed in S&P CNX nifty were considered as sample and S&P 500 was considered as market index. S&P CNX NIFTY is a well diversified composite index with fifty most actively traded stocks. Two stocks (Coal India and Infosys) were removed from the analysis due to insufficient data. Final analysis includes only 48 stocks. These 48 stocks represent 16 different industry types which given in table 1. Table 2 depicts the number of stocks belonging to each industry type. The study data consisted of daily closing prices of the sample stocks and closing index of the value of S&P CNX 500. The data were obtained from Prowess source. In all, there were 11,539 trading days during the study period.

Table 1.Industry wise classification of sample stocks

S.No	Stock	Industry	S.No	Stock	Industry
1	Bajaj	Auto mobile	26	HDFC	Finance
2	Hero Honda	Auto mobile	27	IDFC	Finance
3	M & M	Auto mobile	28	Coalindia	mining
4	Maruti	Auto mobile	29	Sesa goa	Mining
5	Tata motors	Auto mobile	30	Cipla	Pharma
6	Axis bank	Bank	31	Dr Reddy lab	Pharma
7	HDFC Bank	Bank	32	Ranbaxy	Pharma
8	Kotak Mahindra	Bank	33	Sunpharma	Pharma
9	ICICI	Bank	34	BPCL	Refineries

10	PNB	Bank	35	Reliance	Refineries
11	SBI	Bank	36	Carin	Oil & Gas
12	ACC	Cement	37	GAIL	Oil & Gas
13	Ambujam	Cement	38	ONGC	Oil & Gas
14	Grasim	Cement	39	NTPC	Power
15	HCL	Computers	40	Power grid	Power
16	Infosys	Computers	41	Reliance infra	Power
17	TCS	Computers	42	Reliance power	Power
18	Wipro	Computers	43	Tata power	Power
19	DLF	Construction	44	Hindalco	Steel
20	Jaiprakash	Construction	45	Jindal	Steel
21	ITC	Diversified	46	SAIL	Steel
22	HUL	Diversified	47	Sterlite	Steel
23	BHEL	Electrical	48	Tata steel	Steel
24	L & T	Electrical	49	Bharti Airtel	Telecom
25	Siemens	Electrical	50	RCOM	Telecom

Table 2. List of stocks in each type of industry

S.No	Industry	No. of stocks	S.No	Industry	No. of Stocks
1	Automobiles	5	9	Mining	2
2	Banks	6	10	Oil & Gas	3
3	Cement	3	11	Pharma	4
4	Computers	4	12	Refineries	2
5	Construction	2	13	Power	5
6	Diversified	2	15	Steel	5
7	Electrical	3	16	Telecom	2
8	Finance	2			

Research methodology

MS Office Excel 2003 and SPSS16 for windows were used to calculate the Holding period Return (HRR), Daily return, Standard deviation, skewness, kurtosis and correlation coefficient among the stocks. Dividend paid during the study period, transaction cost, brokerage, taxes, and other charges were ignored.

TOOLS OF ANALYSIS

Holding period return

HPR is the total return on an asset or portfolio over the period during which it was held. It is one of the simplest measures of investment performance. HPR is the percentage by which the value of a portfolio (or asset) has grown for a particular period. The formula for the holding period return is used for calculating the return on an investment over multiple periods.

$$HPR = (P_1 - P_0)/P_0 * 100$$

HPR was calculated for four different holding periods. Considering closing price of respective stocks as on 31-12-2009 as a base price, HPR for each stock has been calculated for the last trading days of March, June, September, and December months of the year 2010.

Daily return

Daily returns of the stock were calculated using continuous compound growth rate of return (CCRR) method. It is assumed that stock prices are normally distributed, that is natural logarithm (ln) of stock prices is normally distributed.

$$R_i = \ln(P_t/P_{t-1})$$

Unlike a normal distribution, a lognormal is not symmetrical. Also a log normally distributed variables has a minimum value of zero and maximum value of infinity, where as a normally distributed variable has a minimum value of minus infinity and maximum value of infinity. Because of stock prices cannot have a less than zero, they can be represented by log normal distribution but not a normal distribution.

Annualized return

Annualized return was calculated using the below equation.

AR = Sum of daily average returns (or) Daily average returns * No. of trading days

Skewness

The term skewness refers to the lack of symmetry. The lack of symmetry in a distribution is always determined with reference to a normal distribution. Note that a normal distribution is always symmetrical. The skewness may be either positive or negative. When the skewness of a distribution is positive (negative), the distribution is called a positively (negatively) skewed distribution.

- ➢ If Mean > Mode, the skewness is positive.
- ➢ If Mean < Mode, the skewness is negative.
- ➢ If Mean = Mode, the skewness is zero

Kurtosis

It is the degree of peakedness of a distribution, usually taken in relation to a normal distribution. A curve having relatively higher peak than the normal curve, is known as Leptokurtic. On the other hand, if the curve is more flat-topped than the normal curve, it is called Platykurtic. A normal curve itself is called Mesokurtic, which is neither too peaked nor too flat-topped

If one introduces skewness and kurtosis in the utility function then the impact on portfolio allocation is found to be very strong. We show that if investors care about skewness and kurtosis that their allocation may be more conservative with constraint. More work needs to be done to be able to calibrate skewness and kurtosis preference so that they correspond to real life allocations

Standard deviation

It is a widely used measure of variability or diversity used in statistics and probability theory. It shows how much variation or "dispersion" there is from the average (mean, or expected value). It is used to calculate the stock price volatility. It measures how much values are dispersed from the average

$$SD = \sqrt{(\Sigma X - \mu)^2 / N-1}$$

Annualized standard deviation

Annualized standard deviation was calculated using the below equation.

$$ASD = SD * \sqrt{T} \qquad T - \text{Number of trading days}$$

Correlation

It is a measure that determines the degree to which two variable's movements are associated. The correlation coefficient is calculated as:

$$Correl_{xy} = Cov(x,y) / \sigma_x * \sigma_Y$$

Correlation is computed into what is known as the correlation coefficient, which ranges between -1 and +1. Perfect positive correlation (a correlation co-efficient of +1) implies that as one security moves, either up or down, the other security will move in lockstep, in the same direction. Alternatively, perfect negative correlation means that if one security moves in either direction the security that is perfectly negatively correlated will move in the opposite direction. If the correlation is 0, the movements of the securities are said to have no correlation; they are completely random. Correlations are used in advanced portfolio management.

RESULTS AND DISCUSSIONS

Comparative Performance of the stocks

When the annualized return of the stocks were compared with market index, of the total 22 stocks (46%) outperformed the market and 24 stocks (50%) reported low returns than the market.

Tata motors were the top performer with 57% annualized returns, followed by Tata Consultancy service (TCS – 53%), Mahindra & Mahindra (M& M – 51%) indicate that higher market efficiency of the stocks. Table 4 depicts the annualized return of the 48 stocks. Annualized returns of 19 stocks were 25-50%. Annualized return of 24 stocks was less than 25%. Kotak Mahindra (-60.14) and Sterlite (-163.5) stocks were reported negative return indicate that those two stocks have weak market efficiency. When the annualized returns from stocks of similar industry evaluated, stocks belonging to auto mobile (3stocks), bank (3 stocks), cement (2 stocks), computer (2 stocks), electrical (2 stocks), finance (1 stock), diversified (1 stock), oil &gas (2 stocks), Pharma (2stocks), steel (1 stock). Not even single stock from power and refineries sectors outperformed the market.

Table 3. Holding Period Returns (HPR)

Stock	Industry	Jan - Mar	Jan – Jun	Jan - Sep	Jan - Dec
S&P CNX 500		0.923852	1.207826	13.50494	1.733845
Auto mobile					
Bajaj	Auto mobile	13.0799	42.52719	-14.488	-11.1118
Hero Honda	Auto mobile	13.06542	23.26226	14.73844	21.93269
M & M	Auto mobile	30.2127	38.66261	7.294833	52.3404
Maruti	Auto mobile	-9.20156	-9.12476	-7.67141	-8.56911
Tata motors	Auto mobile	-3.38841	2.978764	42.33065	69.42205
Banks					
Axis bank	Bank	18.54907	21.04181	36.12292	37.74835
HDFC Bank	Bank	13.4182	14.08277	46.84184	38.11573
Kodak mahindra	Bank	-7.61947	3.501476	-38.4446	-4.84312
ICICI	Bank	8.523066	-8.61043	28.91721	31.3739
PNB	Bank	-1.41402	2.366112	28.04841	20.75139
SBI	Bank	-7.93556	3.021453	43.91725	25.54765
Cements					

ACC	Cement	9.66948	1.81083	15.78176	25.09025
Ambujam	Cement	15.13677	10.80502	33.60265	35.79286
Grasim	Cement	14.29516	-34.672	22.07822	5.922286
Computers					
HCL	Computers	-2.37875	0.742484	16.83446	23.5468
TCS	Computers	4.289226	1.125222	24.00929	57.19787
Wipro	Computers	3.774218	-42.09	17.45522	17.45522
Construction					
DLF	Construction	-14.8199	-6.29076	31.6861	22.9783
Jaiprakash	Construction	1.697689	-12.6611	-5.69867	-12.293
Diversified					
ITC	Diversified	9.75091	23.93554	27.9112	-1.54894
HUL	Diversified	-10.1199	1.187361	17.88853	20.58743
Electrical					
BHEL	Electrical	3.131607	6.469772	8.324357	1.679499
L & T	Electrical	-2.73933	7.870267	23.18978	18.76215
Siemens	Electrical	27.94999	28.00761	43.15003	41.98872
Finance					
HDFC	Finance	1.023904	17.03602	42.40786	41.94839
IDFC	Finance	3.970092	17.29637	33.62668	19.3145
Mining					
Sesa goa	Mining	13.40347	-12.8248	-7.00587	0.644063
Pharma					
Cipla	Pharma	2.268126	1.218897	-3.60187	10.87426
Dr Reddy lab	Pharma	11.97497	26.69122	26.70453	46.86161
Ranbaxy	Pharma	-8.0637	-3.03984	21.05275	15.5972
Sunpharma	Pharma	18.78573	19.0509	39.26579	66.36821
Refineries					
BPCL	Refineries	-18.6472	4.060356	16.85649	5.056171
Reliance	Refineries	-1.72452	0.290671	-9.08787	-2.57796
Oil & Gas					
Carin	Oil & Gas	7.911504	7.646018	17.80531	17.89381

GAIL	Oil & Gas	-1.16062	12.81408	15.98529	25.64058
ONGC	Oil & Gas	-7.56759	11.3025	21.01916	11.75758
Power					
NTPC	Power	-11.1913	-14.4083	8.982467	-7.1806
Power grid	Power	-2.46902	-2.79503	3.20457	9.77513
Reliance infra	Power	-13.3866	5.867001	-6.63946	-25.9903
Reliance power	Power	-4.04754	10.21523	3.437199	1.381304
Tata power	Power	-0.6153	-5.87189	5.257671	0.944204
Steel					
Hindalco	Steel	12.46604	-10.2989	22.46162	53.90788
Jindal	Steel	-0.32503	-11.4894	0.559214	1.027592
SAIL	Steel	7.484507	-17.8974	-12.6386	-21.8687
Sterlite	Steel	-1.34398	-80.1604	-2.3172	12.10893
Tata steel	Steel	2.472643	-21.1578	7.407843	12.11948
Telecom					
Bharti Airtel	Telecom	-5.19725	-20.7009	10.73187	8.230503
RCOM	Telecom	-0.29144	15.10259	-2.04593	-15.19

Buy and hold strategy and market timing strategy

The buy and hold strategy suggests that the longer we hold a stock, the more likely we are to earn good returns. Efficient market hypothesis (EMH) strongly supports the buy and hold strategy. EMH argues that a stock is fairly valued all times, and it is impossible to get abnormal profits. On the other hand, proponents of market timing strategy advocates that money can be made in short term by buying on low and selling on the rights.

Stocks like Tata motors, TCS, HCL, Axis bank, ACC, HUL and sunpharma holding periods form March to December it was gradually increasing. One year holding period of the stocks compared with the annualized returns, holding period of some of the stocks outperformed the annualized returns indicated the strong market efficiency of the stocks. This silently indicated that the company is having some additional projects and they are going to expand their market.

Most the stocks have negative holding period in the first period. In this, investors asked tax deduction after that they buy and hold the stocks. However Sterlite and Kotak mahendra stocks that reported negative holding period in start and end holding period. Some of the

stocks form steel, power, refineries, banks, telecom and oil & gas sector reported negative HPR in the first period.

Another interesting stock that needs to be examined is how long one needs to hold the stocks. Eighteen stocks outperformed their annualized returns for one year holding period returns. Nineteen of the sample stocks reported highest holding period returns during nine month holding period.

In table 4, depicts that some of the stocks have medium holding period indicated that semi strong market efficiency and the prices of the stocks were in the growth and it have a chance to increase. Some of the stocks have minimum holding period indicates that weak market efficiency of the stocks and the price of the stocks were decreasing in the market.

Highest volatility was observed in these stocks: Sterlite (141%), Kotak Mahindra (73 %), Bajaj auto (78%), ITC (79%).

Lowest volatility was observed in these stocks: reliance communications (2%), Bharti Airtel (19%), NTPC (22%), and Powergrid (22%), if the investors invest in the lowest volatility stocks means it will give the positive return to them.

Table 4. Annualized returns and standard deviation

Stock	Industry	Daily Average return %	Std Deviation %	Annualized return %	Annualized std. Dev %
S&P CNX 500		**0.11**	**1.11**	**27.61**	**17.62**
Automobiles					
Bajaj	Auto mobile	0.05	4.93	12.55	78.29
Hero Honda	Auto mobile	0.14	2.25	35.14	35.73
M & M	Auto mobile	0.167	2.32	50.4	36.85
Maruti	Auto mobile	0.05	1.74	10.04	27.63
Tata motors	Auto mobile	0.223	2.6	56.20	41.28
Banks					
Axis bank	Bank	0.13	1.89	32.76	30.01
HDFC Bank	Bank	0.14	1.64	35.23	26.04
Kodak mahindra	Bank	-0.24	4.6	-60.04	73.05
ICICI	Bank	0.11	2.6	27.88	41.28

PNB	Bank	0.1	1.89	25.1	29.69
SBI	Bank	0.096	2.1	25.1	33.24
Cements					
ACC	Cement	0.15	1.97	37.65	31.28
Ambujam	Cement	0.13	2.21	32.76	35.1
Grasim	Cement	0.013	2.2	3.26	34.94
Computers					
HCL	Computers	0.11	1.89	27.61	30.013
TCS	Computers	0.21	1.75	52.71	27.79
Wipro	Computers	0.13	3.74	32.13	59.40
Construction					
DLF	Construction	0.1	2.72	25.1	43.19
Jaiprakash	Construction	0.28	2.7	35.14	42.87
Diversified					
ITC	Diversified	0.15	4.82	37.8	76.54
HUL	Diversified	0.079	1.96	19.82	31.12
Electrical					
BHEL	Electrical	0.07	1.2	17.57	19.05
L & T	Electrical	0.12	1.65	30.12	26.20
Siemens	Electrical	0.15	1.63	37.65	25.88
Finance					
HDFC	Finance	0.14	1.6	35.14	25.41
IDFC	Finance	0.1	2.1	18.77	33.34
Mining					
Sesa goa	Mining	0.08	2.6	20.1	41.3
Pharma					
Cipla	Pharma	0.04	1.7	10.04	26.99
Dr Reddy lab	Pharma	0.16	2.96	40.91	47.00
Ranbaxy	Pharma	0.061	2.16	15.31	34.30
Sunpharma	Pharma	0.198	1.43	49.89	22.70
Refineries					
BPCL	Refineries	0.02	2.13	5.49	33.82

Reliance	Refineries	0.011	1.65	2.77	25.72
Oil & Gas					
Carin	Oil & Gas	0.152	2.13	38.15	33.82
GAIL	Oil & Gas	0.12	1.5	30.12	23.82
ONGC	Oil & Gas	0.043	1.5	10.79	23.82
Power					
NTPC	Power	0.06	1.4	15.06	22.23
Power grid	Power	0.043	1.4	10.79	22.23
Reliance infra	Power	0.013	2.13	3.3	33.83
Reliance power	Power	0.05	2.21	12.55	35.05
Tata power	Power	0.012	1.61	3.012	25.56
Steel					
Hindalco	Steel	0.17	3.67	42.67	58.27
Jindal	Steel	0.005	1.77	12.6	28.10
SAIL	Steel	0.105	2.17	26.35	34.45
Sterlite	Steel	-0.649	8.86	-163.15	140.69
Tata steel	Steel	0.11	2.52	24.42	40.02
Telecom					
Bharti Airtel	Telecom	0.007	1.2	1.757	19.05
RCOM	Telecom	0.07	0.14	17.57	2.2232

Skewness and Kurtosis

Table 5, depicts the skewness and kurtosis of the stocks. Negative price of market skewness and positive price of market kurtosis risk suggest that an increase (less negative) in market. Skewness is related to deteriorating future investment opportunity set whereas an increase in market kurtosis is related to improving future investment opportunity set.

Some of the stocks (Bajaj auto, BPCL, RCOM, Rpower, tatapower,Kotak Mahindra and Sterlite) have high positive skewness with high sensitivities to innovations that implied market volatility and skewness exhibit low returns on average. Stocks like Tatamotor, Axis bank, DLF, PNB and SBI have negative skewness implied that higher market return.

Some of the stocks (ACC, Ambujam, DLF, Dr Reddy's, HeroHonda, HDFC bank, PNB, ITC, Tata motor, Tata steel) have more market kurtosis exhibit somewhat higher returns on

average. Stocks (BPCL, Grasim, reliance refineries, jindal and IDFC) which are having less kurtosis indicated that minimum market return.

A negatively skewed trade is characterized by a concave function of the underlying price level, which delivers steady profits with low volatility most of the time. Investors can collect premiums by shorting put options and reinvest them into risk-free assets

Table 5. Skewness and Kurtosis of the sample stocks

S.No	Stocks	Skewness	Kurtosis
S&P CNX 500		**-1.64823**	**11.1254**
1	ACC	0.794456	2.820753
2	Ambujam	0.736843	2.361752
3	AXIS	-0.12957	0.975766
4	Bajaj auto	12.8046	15.3023
5	BHEL	0.171721	0.525933
6	BPCL	1.425533	0.922814
7	Bharti Airtel	-0.00997	3.272256
8	Carin	1.32239	15.7104
9	Cipla	-0.35382	4.701347
10	DLF	-1.82776	13.61081
11	Dr Reddy's lab	-0.58605	4.428
12	GAIL	0.012429	0.754302
13	Grasim	-2.00977	0.98797
14	HCL	-0.18549	1.932888
15	HDFC bank	-1.06597	8.335766
16	Hero motor	1.702613	14.22155
17	Hindalco	-0.18074	1.243835
18	HDFC finance	0.308405	0.220129
19	HUL	-0.67518	4.032553
20	ICICI	0.052833	1.03007
21	IDFC	-0.28437	0.061214
22	ITC	-13.4629	17.9621
23	Jaiprakash associates	-1.39847	9.09017
24	Jindal	-0.23576	0.176176
25	Kotak Mahindra	11.0656	150.1369

26	L & T	-1.76767	13.78651
27	M&M	-0.13864	3.098726
28	Maruti	1.63138	12.94061
29	NTPC	2.31009	18.01757
30	ONGC	1.802162	3.277269
31	PNB	-0.14585	6.454974
32	Power grid	-0.44724	4.43682
33	Ranboxy lab	-2.69706	27.86622
34	RCOM	0.632992	3.213796
35	Reliance industries	-0.05429	0.763223
36	Reliance power	0.149563	5.010353
37	Reliance infra	-0.042	2.343686
38	SBI	-0.7768	6.447791
39	Sesa goa	0.007725	1.944037
40	Siemens	-0.522506	1.316076
41	SAIL	-0.38454	3.54131
42	Sterlite	13.588	99.7095
43	Sunpharma	-0.1031	12.9
44	Tatamotor	-0.60995	7.139941
45	Tatapower	1.38927	12.91357
46	Tatasteel	-1.4732	11.56713
47	TCS	-1.38927	3.2996
48	Wipro	-10.0039	130.8276

Correlation analysis

By investing in different securities investors can reduce the portfolio risk. The fundamental premise behind diversification is that portfolio risk and volatility can be lowered by investing in a number of different asset classes which have varying levels of risk. In order to achieve effective diversification portfolio holding should not be highly correlated.

From the table 6. it is evident that most of the stocks have positive correlation with the market index. It can be said that all the stocks in S&P CNX Nifty are moving in tandem with the market. However few stocks have very high correlation (ICICI, HDFC Finance, Ambujam cements, HDFC Bank and Punjab national bank), implies that as one security

moves, either up or down, the other security will move in lockstep, in the same direction and few stocks have weak correlation (hero motors, reliance industries, jindal, BHEL and Reliance power).

Some of the stocks have negative correlation implies that the security moves in either direction the security that is perfectly negatively correlated will move in the opposite direction While selecting the stocks for a portfolio we need to take note of correlation. By combining high correlation with low correlation stocks, we can minimize the portfolio risk.

Table 6. Correlation between S&P CNX 500 and Sample stocks

1	ACC	0.766859	17	Hindalco	0.863875	33	Ranboxy	0.913359
2	Ambujam	0.928661	18	HDFC fin	0.929925	34	RCOM	-0.04729
3	AXIS	0.837359	19	HUL	0.911736	35	Rel ind	0.133073
4	Bajaj	-0.48877	20	ICICI	0.943068	36	Rpowe	0.405342
5	BHEL	0.281941	21	IDFC	0.860085	37	Rinfra	-0.31265
6	BPCL	0.788647	22	ITC	-0.72412	38	SBI	0.918007
7	Bharti Airtel	0.797277	23	Jaiprakash	-0.38523	39	Sesa	-0.5204
8	Carin	0.780521	24	jindal	0.483469	40	Siemens	0.868833
9	Cipla	0.507094	25	Kotak mahin	-0.8202	41	SAIL	-0.26762
10	DLF	0.519152	26	L & T	0.940554	42	Sterlite	-0.71072
11	Dr reddys	0.830034	27	M&M	0.611057	43	Sunpharma	-0.42733
12	GAIL	0.845624	28	Maruti	0.523233	44	Tatamotor	0.9221
13	Grasim	-0.11631	29	NTPC	-0.13174	45	Tatapower	0.432677
14	HCL	0.788984	30	ONGC	0.8003	46	Tatasteel	0.528969
15	HDFC bank	0.924035	31	PNB	0.923047	47	TCS	0.897934
16	Hero motor	0.167135	32	Power grid	-0.26707	48	Wipro	-0.61544

Portfolio selection

From the above results, based on the holding period, standard deviation, skewness and kurtosis and correlation analysis three sets of portfolio were selected. For the portfolio selection, Stocks like Tata motor, TCS, Mahindra & Mahindra, Hindal co and Sunpharma were selected for the portfolio. Table 7 showed the stocks which are selected for the portfolio.

Table 7 a) Selected stocks holing periods for the Portfolio

Stocks	Industry	Jan - Mar	Jan – Jun	Jan - Sep	Jan – Dec
S&P CNX 500		0.923852	1.207826	13.50494	1.733845
Tata motors	Auto mobile	-3.38841	2.978764	42.33065	69.42205
M & M	Auto mobile	30.2127	38.66261	7.294833	52.3404
TCS	Computers	4.289226	1.125222	24.00929	57.19787
Sunpharma	Pharma	18.78573	19.0509	39.26579	66.36821
Hindalco	Steel	12.46604	-10.2989	22.46162	53.90788

Table 7 b) Stock returns, skewness and kurtosis and correlation for portfolio

Stocks	Annualized return %	Standard deviation %	Skewness	Kurtosis	Correlation
Tata motors	56.20	41.28	-0.60995	7.139941	0.9221
M & M	50.4	36.85	-0.13864	3.098726	0.611057
TCS	52.71	27.79	-1.38927	3.2996	0.897934
Sunpharma	49.89	22.70	-0.1031	12.9	-0.42733
Hindalco	42.67	28.27	-0.18074	1.243835	0.863875

Tata motor has very high return and positive holding period among the stocks. It has very high correlation, negative skewness and excess kurtosis.

TCS and M &M have positive holding periods and the return is comparatively high with the market return. These stocks have high positive correlation, negative skewness and the kurtosis is indicated that expected return would be high. Positive correlation indicates that returns for the two stocks move with the market together in a completely linear manner.

Even though sunpharma has negative correlation this means that the returns of the stock have the same movement with the market index but in opposite. Hence it was selected because the portfolio will be nullified.

CONCLUSION

It is assumed that investment in common stocks provide more returns than any other financial assets. Current study provides evidence to this argument. There is a positive relationship between the stocks holding period and the measures of dispersion with the market return. Eighteen stocks outperformed their annualized returns for one year holding period returns. Nineteen of the sample stocks reported highest holding period returns during nine month holding period. Longer holding period increase the return of the stocks, invest in negatively

skewed stocks also increases the return of the stocks. Negative skewness indicates the put option and the positive skewness indicates the call option of stocks.

It suggests that investors should sell the stock when it meets their expected return. Another important finding of the study is that some of the sticks were outperformed the market index. Significant positive correlation was found among the stocks with the market index. This suggests that all stocks are moving in tandem with the market. Based on this, investors advised to design portfolio in which equilibrium is maintained high and weak correlation stocks.

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